ELECTRICITY ON THE FARM Magazine

NOVEMBER 1957

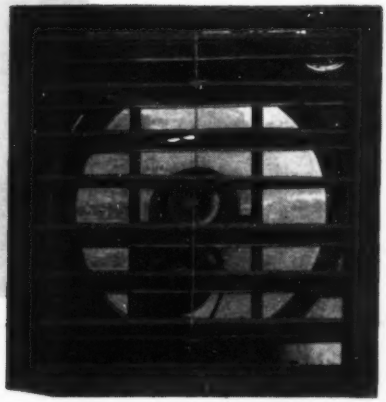
OUR 30TH YEAR—THIS MONTH 883,000 COPIES

Is Your Well Sanitary? ..... page 5

New Milkhouse Heating Concept ..... page 8

Christmas Dreams Galore! ..... page 22

Good management and ventilation go hand-in-hand. Smart dairymen want healthy, contented cows and pleasant working conditions. Turn to page 10 for answers to ventilation questions.



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Editor's Chat

A SHOPPING GUIDE

Probably there are some married men who find time to read this part of the magazine and for them we have this little suggestion. Any of you ladies who chance upon this may get in on it, too.

Every so often, like at Christmas or a birthday, someone asks, "What do you want?" And either from modesty or ignorance or an attempt to be polite the answer is "I don't know". Don't be like that, even if it is good manners.

Stick up a card and every time you find yourself lacking some desired tool in the farm shop or kitchen jot it down on the card. And when you have a dime or a dollar you don't know what to do with, or someone sticks his or her neck out with that old question "what do you want"; knock 'em cold with your little list of needed tools and appliances.

It really works. We have an electric drill now instead of a new lamp in the dining room.

LET'S *SEE ABOUT* THIS

Just for fun try this: blindfold yourself, and for just a little while experiment to see how it would seem to be blind all of the time. Then, put on some real dark glasses and see how it is to be partially blind. Many of us actually do totter around in the dark, or in such poor lighting that we cannot see very well. And the net result is unnecessary accidents.

It is relatively easy and cheap now to have good lighting everywhere you go in the house, the barn, the shop and the farm yard. But it does take some thought and planning and there is no better time to "see about this" than right now. See what you can do.

Incidentally, livestock and chickens seem to do better if they, too, have good lighting.

SAFETY & EASE

These two words may bring a picture to your mind of sitting on the porch in a rocking chair. But to the man with a silo unloader they come every morning and night when he turns a starter button instead of climbing up a ladder to pick and pitch silage down for the cows.

"Whistler's Mother" could do the job from her rocking chair and you will be doing it yourself someday, too. Maybe you will use a high stool or even stand up to turn the switch. But either way is easier and safer than going up and pitching silage down by hand. Try it.

THE OLD "HOT FOOT"

Perhaps you are familiar with that phrase "hot foot". If not, it refers to a playful practice of the police who like to find a tramp sleeping on a park bench and rap the sole of his feet with a club. It makes an excellent alarm clock.

Sometimes it takes a treatment almost that severe to make some of us wake up to the fact that we should put a little electric heating cable in the floor, or under a false floor in the milkhouse, or in front of the bench in the shop, or maybe where you stand to sort eggs. You can ease your old chilblains and add materially to comfort at a very slight expense. For real luxury, add a heat lamp set to shine on the back of your neck.

If you can keep the ends warm and comfortable you will be comfortable all over. Heating cable and heat lamps can do it.

Jim Ridout

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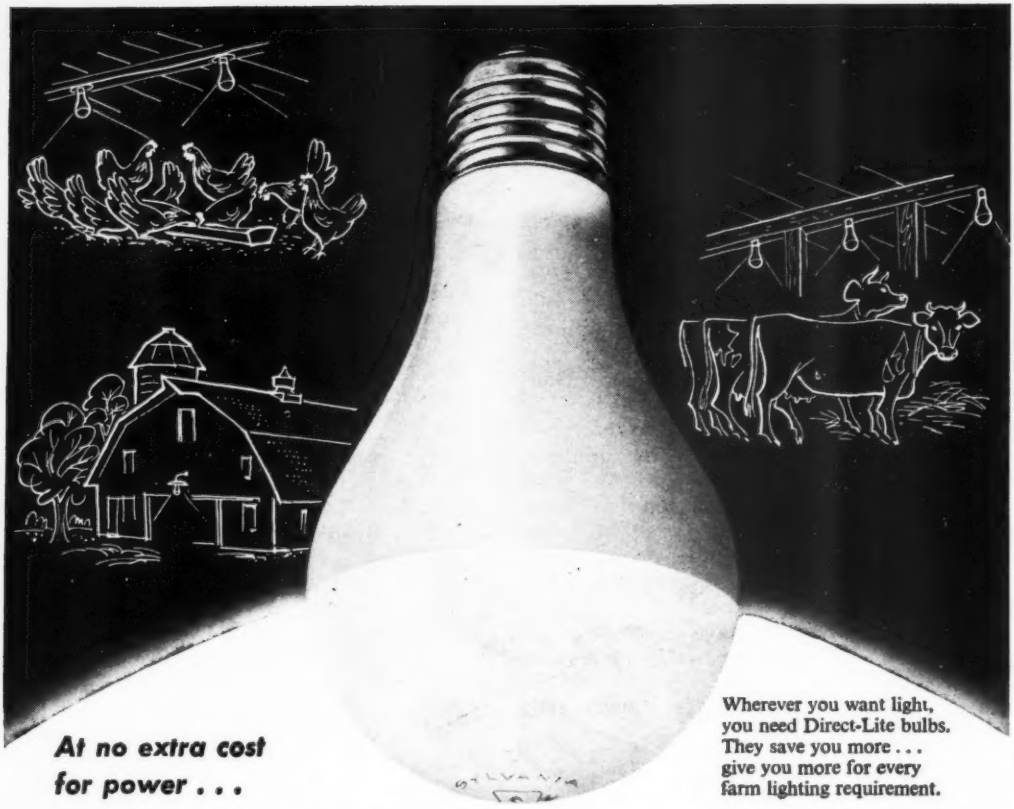

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Is Your Well Sanitary?

Pitless pump units provide protection against contamination

By KENNETH L. McFATE*

An adequate supply of water, properly protected, is essential to any complete pressure water system. When installing the water system, sanitation should not be neglected. The well should be located at least 50 feet away from all sources of contamination such as barns, feed lots, septic tanks, sewage disposal lines, and low spots in the immediate terrain.

Underground Discharge Unit

The type of pump being installed will partially determine the location of the unit. The deep well pump and submersible pump must be located at the well. All of the shallow well pumps and the deep well jet pumps can be located either over the well or away from it.

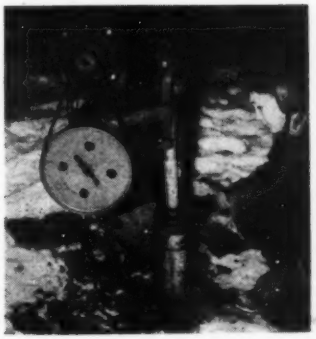
The pitless assembly unit replaces the top six to eight feet of well casing usually used. The outside casing of a pitless unit is screwed into the regular well casing and a packing gland with accessory equipment is installed inside the casing below frost level. This packing gland prevents the water from rising above this point, and also provides a mechanism for diverting the water from the well casing into a pipe going horizontally underground to a remotely located pressure tank. The pressure tank, and the pump in the case of the jet pump, are located in a remote warm area.

To avoid digging up the underground connection every time pumping equipment needs servicing, there is a sealing device of leather, rubber, plastic, or metal which permits easy removal of internal parts without disturbing underground piping.

Frost Pits Eliminated

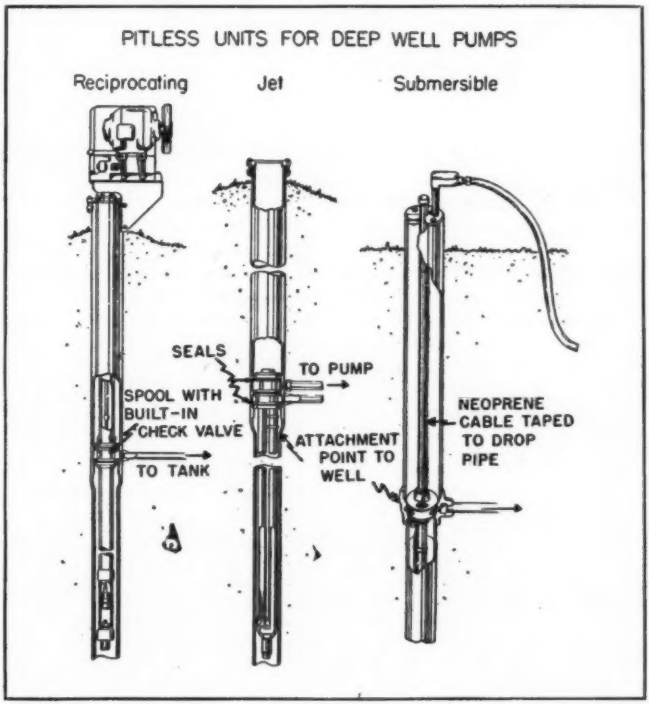
The pitless underground unit installation offers a very good solution to overcoming unsanitary frost pits for wells. While the additional cost of a complete unit varies with the type of pump and length of pipe needed, it compares favorably with a well-insulated pump house.

Farmers specializing in Grade A milk production should check with their local health authorities and milk inspectors before installing a pitless pump installation. Regulations concerning the use of such units vary in different parts of the country. □ □

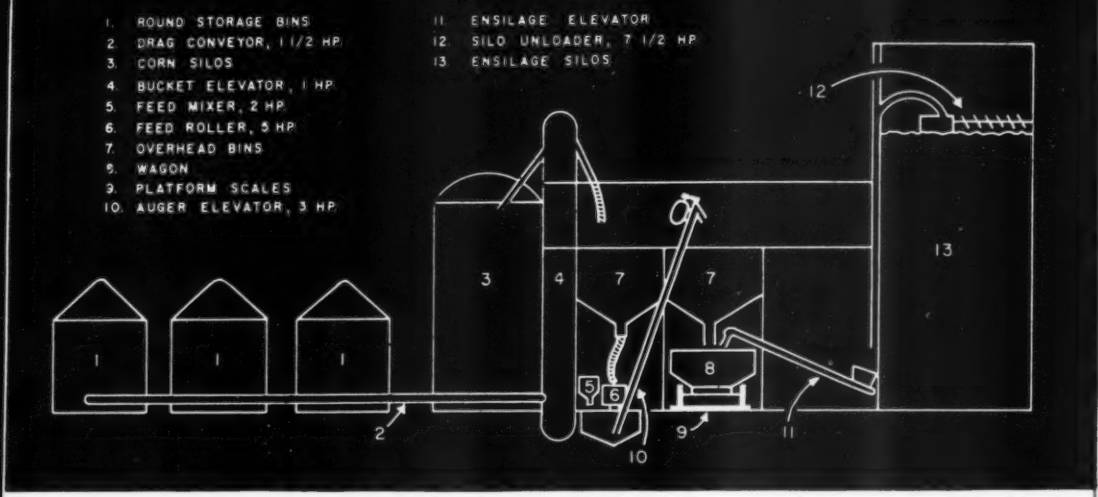


TYPICAL PITLESS FROSTPROOF ADAPTER used with a reciprocating pump. The water discharge pipe is underground, below frost level. Frostproof hydrant tapped into line provides water at well. A light metal cover (removed to show installation) protects the above-ground parts.

Below: CONSTRUCTION AND INSTALLATION details of pitless units for typical deep well pumps.



* Mr. McFate is Leader, Farm Electric Utilization Project, Department of Agricultural Engineering, University of Missouri.


1. ROUND STORAGE BINS
2. DRAG CONVEYOR, 1 1/2 HP
3. CORN SILOS
4. BUCKET ELEVATOR, 1 HP
5. FEED MIXER, 2 HP
6. FEED ROLLER, 5 HP
7. OVERHEAD BINS
8. WAGON
9. PLATFORM SCALES
10. AUGER ELEVATOR, 3 HP
11. ENSILAGE ELEVATOR
12. SILO UNLOADER, 7 1/2 HP
13. ENSILAGE SILOS

How to Make Feed Handling A One Man Operation

Plan for efficiency and economy, move all materials mechanically.

By J. C. SUTTON

Beef cattle feeding on a large scale has assumed new proportions with the aid of electricity in southern Michigan. William K. Brown of Tecumseh uses seven electric motors totaling 21 hp to assist him in his feeding yard. Brown is able to complete each feeding of his 650 head of cattle in forty five minutes of one man's time. The operation requires no manual labor, only the attention of an operator.

Brown is an agricultural graduate of Michigan State University. Upon completing his formal education, he married and promptly established himself on eleven hundred acres of land, owned by his father, which was elaborately equipped for modern dairy farming. Very shortly thereafter the Browns suffered the misfortune of a disastrous fire to their dairy farm buildings and new plans were necessary.

Selecting a new site with certain advantages for the operation, Brown began laying plans for a beef cattle feeding project. He determined how many cattle he could feed on the farm's production capacity. The figure was tentatively set at 650 head the year-round.

Greatest Saving in Materials Handling

Much planning and thought was given to the problem of storing and handling of feed because this was where savings in operating costs and time could be made. Brown doesn't like scoop shovels and realizes they are expensive to operate. He has one, but it is usually found hanging on its nail on the wall. His entire system of feed handling is based on mechanized materials handling. All ingredients are handled in bulk and are conveyed from point of storage to mixing and loading area by elevators and screw conveyors.

The feed room is a frame structure 40 ft. by 40 ft. and 20 ft. high to the plate. It is arranged so that it can be driven through and has a platform scale in the driveway which is one of the most important tools in Brown's operation. The scales make it possible for him to know at all times the various statistics relative to his business.

Eleven bins designed to hold

100 tons of feed in process of mixing or concentrates and supplements used in the feeding program are located above the feed room. Two concrete stave silos, 20 ft. by 50 ft., each capable of storing 380 tons of ensilage are at one side of the feed room. Each has a 7½ hp silo unloader. Field shelled, batch dried corn is stored at the opposite side of the feed room in two more concrete stave silos. Six round bins, arranged close to these two silos, store additional dry corn. The total storage of these units is 30,000 bu. All are arranged so that corn will flow by gravity to a 1½ hp horizontal drag elevator. This conveys the corn into the hopper of a 1 hp vertical bucket type elevator which lifts the grain into overhead bins. The two corn storage silos can also be filled by means of the bucket elevator.

Corn elevated to the overhead service bins is drawn off by gravity into a 5 hp roller type grain crusher. From there it falls into the hopper of a 3 hp screw conveyor which again elevates it to another bin.

All Feed is Weighed

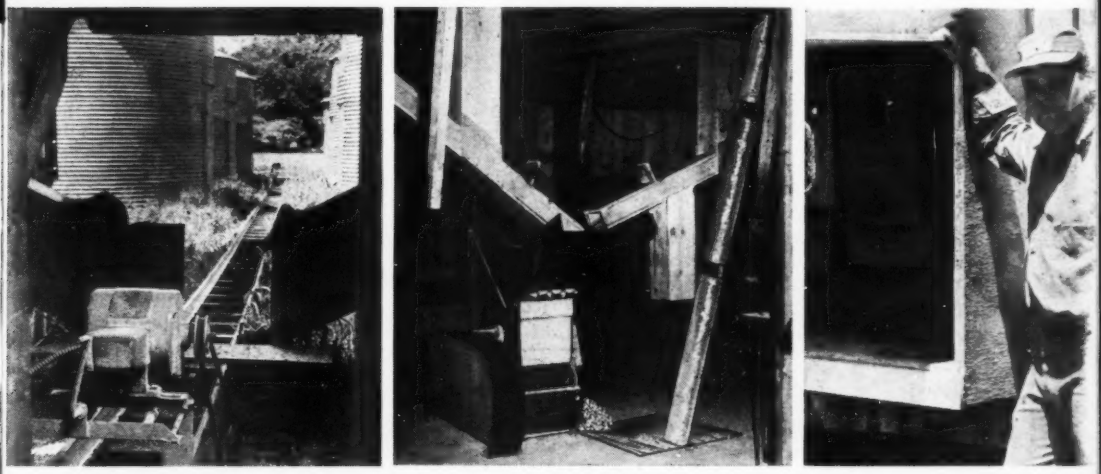
Concentrates and supplements used in the feed ration are purchased in bulk and stored separately in the overhead bins. They are mixed as used in a 2 hp feed mixer. After mixing, the concentrates flow into the hopper of the screw conveyor and are elevated to another overhead bin.

Actual distribution of the feed and concentrate in the feed bunks is done by an automatic side unloading wagon. The wagon is drawn onto the scales in the feed room. Ensilage is loaded into it by an elevator from the silo unloader chute and weighed. The proper amount of crushed corn is weighed out as it is drawn by gravity from a bin above. Finally, concentrates in the proper proportion are added to the corn and ensilage. The side unloading wagon distributes the load into the feeding bunks around the feed lot. The action of the side unloading wagon mixes the ensilage, corn and concentrate as it unloads.

During the past year, which was Brown's first year of operation, he baled his hay. Now he has tentative plans for field chopping and mow drying in the future. He plans to use two 7½ hp motors in this operation, one in each mow.

Three phase electric service being available, Brown equipped his plant throughout with three phase motors. Because of the arrangement of the buildings and because plans were made to use rather large amounts of power, in other than the feed processing operation, it was deemed wise that service be distributed from a central point outside of the buildings proper. Service was therefore brought from a central point distribution pole on which the meter was located. Power is easily distributed both ways from that point.

Now that Brown's stock feeding plant is in full operation, it is evident that he planned wisely to keep labor and operating costs at a minimum. With the plant designed for storing and handling home grown feeds and concentrates purchased and stored in bulk, Brown is surely in a most favorable position to profit in his operation. □ □



Left: DRAG CONVEYOR brings corn from storage bins and corn silos to hopper of vertical bucket elevator. Portable augers are used to bring grain from bin to this conveyor. Center: SHELLED CORN is crushed in this 5 hp feed roller. Crushed corn drops from mill into pit and is elevated to overhead bin by inclined six-inch auger conveyor. Right: NERVE CENTER of Bill Brown's feed preparation building is this 200 ampere entrance and control center, only a small portion of which is shown here.

CROMER used 4600 watts of heating cable connected to a 230 volt circuit in his 14-foot by 18-foot milkhouse. The thermostat is set at 40°F and reacts to air temperature.

Underfloor electric heat provides

New Milkhouse Heating Concept

By GENE B. PARKER and JAMES R. EVERHART

When O. W. Cromer of Middletown, Indiana, began construction on his new milkhouse and parlor in the spring of 1956, the method of heating had not yet been decided upon. Cromer, as would most farmers, had four basic requirements which he believed a milkhouse heating system should fulfill:

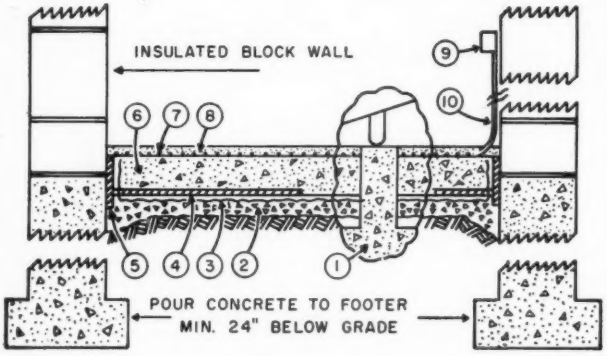
SAFETY—protection of the structure and equipment as well as the operator.

ECONOMY—installation and operation cost estimates were important considerations in the heating of such a structure.

DRY FLOOR—slippery, even icy conditions, are not uncommon in some milkhouses even when some supplementary heat is used. This situation should be eliminated, if possible.

SPACE—space is at a premium in a milkhouse. The heating system must usually "fit around" other essential operating equipment.

It was these requisites to the installation and operation of milkhouse heating which led Cromer to the underfloor electric radiant system. Here is how he did the job.



1. Pour tank leg pillars first and to final grade.
2. Use 4-inches of well tamped gravel fill.
3. Lay .004-inch (4 mil) clear polyethylene vapor barrier over entire floor.
4. Lay 1-inch by 2-foot rigid insulation board around outside perimeter of floor area.
5. Set 1-inch by 6-inch rigid vertical insulation board against all outside wall areas.
6. Use four inches of insulating concrete.
7. Staple cable directly to insulating concrete. Space to give about 18 watts per square foot and install no closer than 6 inches to any plumbing.
8. Finish with 1-¾ inch concrete wear surface.
9. Install thermostat on convenient wall location.
10. Use conduit to protect heating cable leads.

FLOOR CONSTRUCTION

A few construction details had to be changed slightly from those normally used to insure an entirely satisfactory installation. The floor was of prime importance and was built up in the following manner:

Excavation—Floor area was excavated to a depth of ten inches below the desired finished floor level.

Fill—A 4-inch layer of gravel fill was laid and tamped very carefully and completely.

Vapor Barrier—One layer of 4-mil polyethylene film was put down on the gravel fill to act as a vapor barrier. (Care was taken so as not to puncture it.)

Insulation—A rigid vertical insulation was laid around perimeter of room. Strips of 1" by 6" insulation board were used for this and buried two inches into gravel fill, leaving four inches exposed above fill.

Sheets of rigid insulation board, 1" x 2 feet, were laid flat on top of polyethylene film

around the outer edge of the entire floor.

Insulating Concrete—A four inch layer of lightweight concrete aggregate was then poured over entire floor. This concrete was made with cement and concrete type vermiculite fill at a 1:6 ratio. This layer acts as an insulation and prevents heat from passing downward.

Heating Cable—Resistance type heating cable—the same type as that used for ceiling or floor heating in homes—was stapled directly onto the vermiculite-concrete surface. Spacing for cable varies with such factors as milkhouse size, construction, insulation, and wattages per foot of the particular brand of cable used. The heating contractor, electrician, or power supplier representative will gladly supply this information.

Cable Leads—The non-heating leads from heating cable were threaded through conduit leading to thermostat conveniently located on a wall in the room.

Surface Concrete—The insulating concrete with cable stapled in place was wet down and covered with a 1½" layer of standard sand-cement mixture to serve as a wear surface. This layer covered the entire floor area including the vertical perimeter insulation board.

The concrete floor surface was finished as required by the local milk code.

Light-block construction was used for the walls. Six inches of overhead insulation was provided. While Cromer has not yet done so, storm windows and doors, if installed, would aid in preventing heat loss and help to eliminate moisture condensation at these points.

DOES IT DO THE JOB?

Dorman Luttrull, the tenant operator, could not be happier with any heating system. He has often commented, "I'm only sorry that we didn't put it in the pit area of the milking parlor as well." It satisfactorily resolves all four of the points mentioned on safety, economy, dry floor and space.

The system not only heats with complete safety, but does so with no fumes or objectionable gases. The floor dries in minutes after a washdown, regardless of weather conditions. Economy of operation can scarcely be questioned. During the entire 1956-57 heating season the system used only 956 KWHrs. The approximate cost of the insulation and equipment used was $135.00.

All indications are that the underfloor or "cable-in-the-floor" heating system is truly a better way to heat a milkhouse. Those who are installing such systems are again finding that electricity is the better way to help them with their farm chores, whether it is power, light or heat that is needed. □ □

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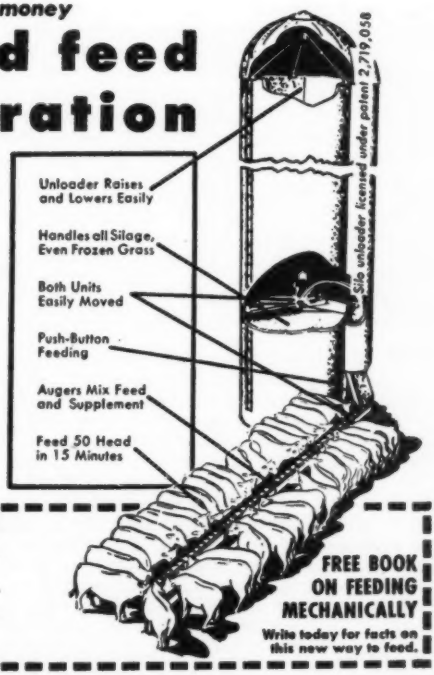
Get full details now. All your questions answered—how you save, how you profit, how you can add a unit at a time. Write today.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An Expert Answers Some Questions on

DAIRY VENTILATION

By R. L. MADDEX*

Why should I, as a dairy farmer, be interested in dairy barn ventilation?

Dairy barn ventilation increases net profits. A good ventilation system reduces the respiratory troubles in animals and the number of veterinarian calls. It results in a more even milk production through the winter months. It reduces building maintenance costs and creates more pleasant working conditions.

What are specific reasons for ventilating?

A dairy stable can fluctuate from warm temperatures and high humidities to cold temperatures during the winter season. The dairy animal produces about 3000 BTUs of heat per hour for every 1000 pounds of animal weight. In addition she gives off two gallons of water a day from her breath. Unless proper controls can be provided in the dairy stable, the high humidity and warm temperatures frequently cause respiratory troubles, particularly in calves. High humidities cause animals to be nervous and go off feed resulting in fluctuating milk production. High humidities and warm temperatures result in moisture condensation on ceiling and sidewalls. Over a period of time this moisture condensation can cause rotting of timbers and paint failures in a building. Dairy stable odors and unpleasant working conditions for the farm operator also result in non-ventilated dairy stables.

What are ideal conditions for cow comfort?

Laboratory studies show that maximum cow comfort and milk production results at temperatures between 45° and 50° with humidities below 75%. Actual milk production is almost constant over a temperature range of 40° to 60° with humidities of 75% or below.

What are the basic requirements?

The most important single factor in a ventilation system is a supply of fresh clean air without drafts. The actual ventilation system is comprised of fresh air inlets, a fan and motor for exhausting the foul air from the stable, an exhaust opening, and fresh air.

How much air is needed?

Enough clean air is needed to remove the excess moisture and control temperatures. The actual amount of air needed for a particular dairy stable would depend upon the number of animals in the stable, the outside temperature at a particular time, the desired temperature inside the stable, and the heat loss through the stable wall. Since the daily climate varies even within a small locality, a maximum air flow is recommended generally with provisions for reducing the air flow on days when the temperature is lower. The recommended air flows in general range from 60 cubic feet per minute per 1000 pounds of animal in the most northern states to 200 cfm per animal in states south of the Great Lakes. Actual recommendations in cubic feet of air per thousand pounds of animal can be obtained from your state university, county extension office or electric power supplier in your area.

How should air be brought into the barn?

Ideally, the air should come into the dairy stable from all four sides at an even rate of flow. Practically, the air should be brought in through fresh air inlets distributed as evenly as possible around the stable. Avoid large openings such as doors, silo chutes, or hay chutes. The general recommendation of approximately 20 square inches of fresh air inlet per 1000 pounds of animal is standard throughout most of the northern states. This 20 square inches of inlet may be in the form of cracks along the wall, slots in the haymow floor, holes in the haymow floor of approximately one inch in diameter or through rectangular inlets in the barn wall. The slot along the haymow floor is generally a continuous slot except for large openings. Approximately 25 one-inch diameter holes are recommended per 1000 pounds of animal if this method is used.

Where should the exhaust fan be located?

The general recommendation for the location of the exhaust fan varies with geographical areas, with the type of ventilation system, and with the dairy stable size. The recommendation most generally made would be to place the fan approximately midway in the long wall of the dairy stable away from prevailing winds. If more than one fan is used, the two fans could be placed side by side in most dairy stables. If the stable is extremely long, over 100 feet, the fans can be sepa-

*Mr. Maddex is Extension Agricultural Engineer, Agricultural Engineering Department, Michigan State University.

rated by about one-third the length of the stable and placed on the same wall. Another design system calls for the placement of fans on opposite walls.

While there may be one best place for a fan or fans in dairy stable layout for the ventilation system chosen, there are other locations where the fan will provide very satisfactory ventilation. A person familiar with the design and workings of a ventilation system can help you locate a fan or fans. The fan should always be located in relation to the fresh air inlets.

How many fans do I need, and what kind?

The number of fans needed will depend upon the ventilation system design. In practically all systems for larger stables, two volumes of air are recommended. This can be obtained by having two fans, by having a two-volume fan with a motor-operated shutter controlled by a thermostat to reduce the volume of air flow as outside temperatures go down, or by a two-speed fan where the actual motor speed is reduced to reduce air flow. The propellor type fan is used in most ventilation systems although the squirrel-cage fan works satisfactorily if properly selected.

Do I need a fan shutter, hood and screen?

The purpose of the fan shutter is to protect against backdrafts and should be used with each fan. The screen should always be used. It provides protection for animals or humans against coming in contact with the fan and causing injury to the fan or to the person making contact. The hood is primarily to prevent backdrafts that will affect the fan operation and is desirable.

What types of motor should be used?

A totally enclosed motor is recommended for ventilation systems since the motor is exposed to dust and moisture from the exhaust fan. Maintenance of the motor consists of keeping the unit fairly free from dust and moisture collection on the motor frame or cover and oiling according to manufacturer's instructions.

What kind of controls work best?

A thermostat for controlling temperatures is used with the dairy ventilation system. The thermostat is a more reliable instrument and much cheaper than the humidistat which operates on the basis of the amount of moisture in the air. There are several makes of thermostat on the market that are quite satisfactory. Generally a thermostat is recommended that will hold temperatures within 2° of that selected by the operator.

The thermostat for a one-fan unit or two fans located side by side should be located in approximately the center of the dairy stable. It should be high enough so that it will not be directly in front of the cows and off center enough that it is not directly in line with the ventilating fan or fans. Likewise it is not desirable to locate the thermostat under a hay chute or some other opening that is likely to place it in a draft. When more than one fan is used and the fans are placed at separate locations in the stable, it is sometimes desirable to cross locate the thermostats so that there is some interlocking of the fan operation. A specific location can be suggested by the person installing your system.

Is special wiring needed?

Since the electric ventilation system is equipment that operates automatically without attendance, it is desirable to have this equipment on a circuit not used for other motors. The actual current demand of most ventilation fans will be below that of a 15 ampere fuse. It then becomes necessary to fuse the circuit according to the current requirements of the fan motor or motors if proper protection to the fan motor or motors is provided. Overload protection for each fan motor can also be provided by use of a fused type outlet and a time delay fuse rated at 1.25 times the current rating on the motor nameplate.

Is it necessary to insulate the dairy stable?

Controlling moisture in a dairy stable depends primarily on moving enough fresh air through the stable to remove excess moisture. As moisture is removed, heat is also removed. If a temperature of 45° is maintained in the dairy stable, the heat loss through the walls when outside temperatures are near 30° is not too great and satisfactory stable conditions can be maintained without insulating the walls. When outside temperatures go down to near zero or below the heat loss through the walls increases greatly. If the dairy stable is located in an area where low temperatures are likely to occur for several days or weeks continuously during the ventilating season, insulated walls are necessary. Recommendations for insulating the dairy stable walls are available in each locality through the agricultural extension office, electric power supplier, or state university.

What should I do about wet spots on walls?

Wet spots on walls or over pens can be overcome by providing fresh air inlets at this point. A calf pen for example can be a few degrees cooler than the rest of the barn if we provide fresh air without drafts in this area and maintain fairly even temperatures.

Can warm air be drawn to cold areas?

It is possible to design a ventilating system that will make use of the warm air from the dairy cow area of the stable to warm colder pen areas of the barn. There are problems involved however in preventing condensation of the moisture from the warm air on cold walls. A system of this type should be designed by someone well experienced in dairy barn ventilation. Generally the recommendation would be to remove the warm air from the stable at the point of heavy cow concentration and bring fresh air in through the colder areas of the barn.

Summary

A ventilation system in the dairy stable pays good returns on the investment.

There is more than one way to satisfactorily ventilate a dairy stable. The most important factor in ventilation is control of the fresh air supply.

There is a definite relationship of the position of exhaust fan to the fresh air inlets.

The size of the dairy stable, the number of animals in the stable, the range of outside temperatures and the temperature maintained in the stable all affect the design of the ventilation system. Controlling temperature in the dairy stable controls the moisture. Correct wiring and fusing of the ventilating fans is important.

The best information for ventilation systems to fit a dairy stable can be obtained from authorities in the general locality where the stable is located. □ □

Follow these basic principles on

How to Prepare for Electric Heat

By F. L. WALKER

"It's just wonderful!" This expression is often heard when a rural home owner is asked about his electric home heating system.

Electric home heating is not new. New home construction accounts for a majority of electrically-heated homes. However, a rapid increase is noted in the number of existing homes where the heating system is being converted to electric. Acceptance of electric home heating has encouraged manufacturers to make available a wide range of equipment that will meet the needs of any conditions.

Insulation Extremely Important

Two very important rules must be observed to make electric home heating operate to the homeowner's satisfaction. They are: (1) **Insulate thoroughly** and in sufficient amounts. (2) **Install the equipment properly.**

To hold down heat losses to a minimum, it is a must to insulate according to the following 6-4-2-formula. Use 6 inches of insulation in the ceiling. This may be mineral or wool, glass fiber or cellulose fiber materials, either blown loose or in batts. Side wall insulation should have not less than a full thick batt (3") of the same material.

Studding space may be filled with blown insulation if batts cannot be installed. Strips of siding can be removed on old homes and a 2 inch hole drilled through the sheathing. The void between studs can then be filled with blown insulation. Often the studding of older homes are full-sized 2" x 4" or larger. Filling this entire space with insulation still further reduces heat loss and operating costs. In homes of brick veneer construction that are being remodeled, the side walls can often be insulated from the inside by removing the baseboard and drilling holes behind the baseboard to permit the insertion of the nozzle of the blower.

When the remodelling job calls for a new plaster coat, holes can be drilled through the old plaster in order to insulate the side walls and the holes will be covered up when replastering. Care must be taken to probe each hole to determine that no obstruction will prevent the insulation from filling the entire space.

The equivalent of a 2 inch insulation batt should be used between the ground and floor or unheated basements and floors. A triple layer of aluminum foil insulating material is often used when insulating under the floor.

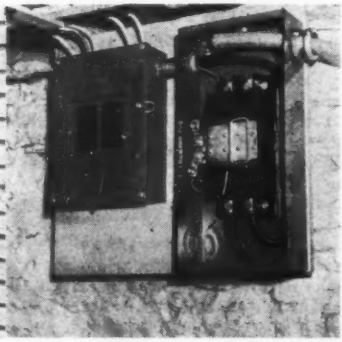
Basements which are to be heated should be insulated by furring the side walls and stapling batts to the furring strips. The use of styrofoam or similar materials cemented to the sidewalls will eliminate furring and the covering of batts where attractiveness is desired.

Vapor Barriers

Vapor barriers are very important as a means of keeping moisture out of the insulation. Moisture, in the form of water vapor, tends to migrate from warm to cool areas. An impermeable vapor barrier material

6-4-2 INSULATION formula calls for 6 inches of insulation in ceilings, 4 in outside walls, and 2 between floor and ground or unheated basement.

FILL INSULATION can be blown into side walls to fill area between studs. Care must be taken to locate fire stops or other obstructions within the wall.



ELECTRICAL SERVICE entrance must provide capacity to handle added load. Generally a 200 ampere service switch is used on electrically heated homes.

will prevent water vapors in the warm, moist indoor air from passing into the insulation, condensing as it reaches the cooler area, and collecting as moisture in the insulating material. Condensation of moisture in insulating material greatly reduces its insulating value. Furthermore, prolonged dampness in some insulating material will even cause rot and deterioration of the insulation and the building structure itself.

Vapor barriers should always be installed toward the room (or heated-in-winter) side of the wall or ceiling. The outside or cold wall should be of material that will allow any moisture vapor in the wall to escape harmlessly to the outdoors.

Vapor barrier sheets are usually a part of mineral wool batts and blankets as they come from the factory. Care should be taken to make sure the proper side is toward the warm area. This is usually marked on each piece. Any tears or holes made when installing should be repaired.

Vapor barrier can be provided in existing homes where fill-type insulation is used by painting the inside surfaces of walls and ceilings with a vapor-barrier paint.

Windows and Doors Must be Tight

Unless double-pane windows are used, it is necessary to install tight-fitting storm windows. All exterior doors should be protected from excessive heat loss by storm doors. Fireplace dampers must be snug and tight fitting.

Heating unit sizes should be individually selected to fit each particular room. This selection must be based upon room size, amount and type of insulation used, window area and external openings. Heating units should be of sufficient size to maintain desired room temperature under all outside conditions. Adequate wiring must be extended to each room to provide proper voltage and amperage capacity to permit efficient operation of the heating elements.

Careful consideration must be given to the selection of the electrical entrance service so that all of the other present and future household needs as well as the heating requirements will be supplied. An entrance switch of 200 amperes is generally used in average-sized homes.

It is important to provide positive and controlled ventilation to remove cooking and tobacco odors or moisture that accumulates. The principle location of an exhaust fan would be over the kitchen range with consideration for an exhaust fan in the laundry room if a dryer is used and in the bathroom if shower baths are taken.

Thousands of people now living in electrically heated homes report that their heating systems provide comfortable, clean, convenient, carefree and safe heat. Furthermore, operating costs are comparable with other fuels.

Regardless of the type of equipment selected, satisfaction can be expected if the equipment is installed in accordance with recommended practices and insulation is properly used. □□

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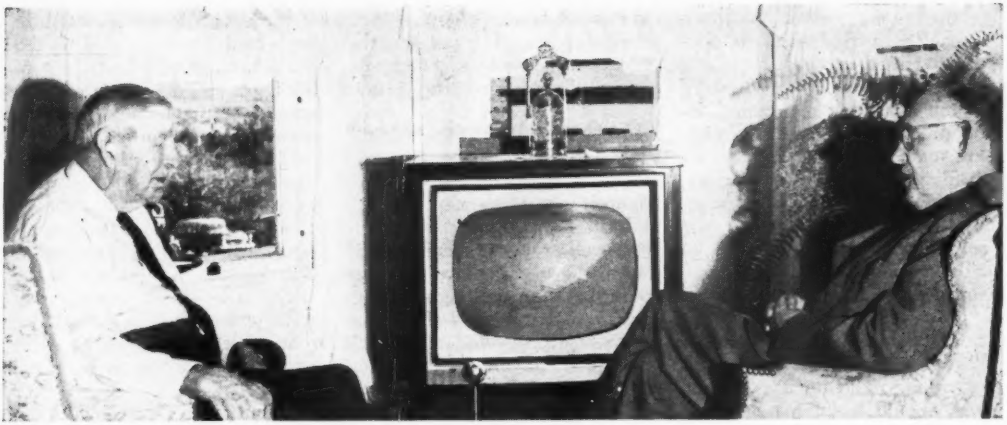


CLEMENTS has seen terrific changes in farm living during his lifetime. Today he receives market reports, news, weather and entertainment as he relaxes in the TV nook of his home. He now lives alone and keeps house with the help of electric appliances.

Our Way of Living Changes

Electrical uses have also changed, costs have decreased

By FRANK R. BAILEY

Some time ago while visiting with Arthur L. Deering, Dean of the College of Agriculture, University of Maine, we were discussing some of the farm electrification studies now in progress at the experiment station. During the visit the Dean brought out a booklet entitled "Electricity on Maine Farms." The book was published in 1929 and covered, among other studies, one made on the Charles C. Clements and Son farm at Winterport, Maine.

A Comparative Look

The reports and comments were of so much interest it was decided that Clements' farm should be visited to check changes and make a comparison report on present use and cost of service. Charles Clements is still active and lives alone in the homestead which is about the same size as it was in 1927-28. The farm covers the same one hundred and fifty acres of land. In the home, the same electric range and refrigerator were used until four years ago when they were replaced by more modern equipment. They now have a 7 cubic foot freezer and three water pumps ranging in size from ¾ to 5 hp.

Clements' son, Norris, now manages the enlarged hatchery which has a capacity to hatch a million chicks a month. The incubators, which have always been oil heated, use electric fans for air circulation and electric power for turning the eggs and operating all controls. They still winter 2000 laying hens and have approximately 4000 replacement stock on range during the summer.

Test Data Compared

The tests which were made on the Clements' farm in 1927-28 revealed the following statistics regarding their use of electricity. During the twelve-month period they used a total of 4,085 KWHrs. As a comparison, they used 144,575 KWHrs during a similar 12 month period in 1953-54! The average cost per KWHr for this service in 1953-54 was only 38% of the cost per KWHr in 1927-28.

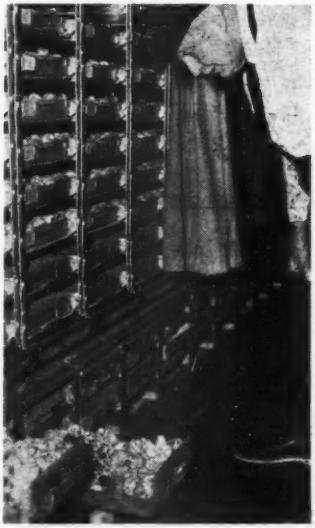
Electricity is one of the few necessities of everyday life that costs less today than it did twenty or thirty years ago. This is possible because power suppliers are constantly improving upon the efficiency of their generating equipment and distribution systems. In 1930, over a pound of coal was needed to generate one KWHr of electricity. Today, our more modern and efficient plants have shaved this figure to somewhere between ¾ and ⅘ of a pound per KWHr.

Some other statements made in the above-mentioned booklet are interesting to reminisce upon today. They include the following: "For cooking, the average monthly consumption of energy on experimental projects where all cooking is done elec-

trically was 35 KWHrs per person." For a family of four this would mean a use of 140 KWHrs per month. Electric ranges, like other appliances, are now much more efficient. Today the national average for a range is 100 KWHrs a month for a family of four.

On household refrigeration, the report states: "The household refrigerator is becoming popular among farm users of electricity. In spite of the high price of this equipment over 50% of the farms on several rural lines have installed electric household refrigerators." Today almost every home has at least one refrigerator. It is considered as an absolute necessity.

Modern day farmers have recognized electrical power and electrical equipment as the most efficient farm hand available to them. It does for him such jobs as barn cleaning, silo unloading, hay and grain drying, handling materials, heating, and ventilating only to name a few. In many instances an electric motor is used as a stationary power source to relieve the tractor for field work. □ □



AUTOMATIC electric controls assure Clements of good, healthy chicks from his incubator.

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LINE-O-HEAT
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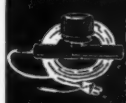

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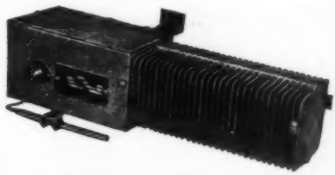

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FREE Samples of Uniform Grind Illustrated Literature

CLIFFORD CRUZEN of Wright, Iowa finds his bench grinder to be one of the most important tools in his shop. He selected a ⅓ hp unit with 6 inch grinding wheels, one fine and one coarse.

Sharp Tools Are Safer Tools

The National Safety Council recently came up with a slogan "Sharp Tools are Safer Tools." We sincerely and heartily agree. It is true with both woodworking tools and metal working tools. It also applies to field machinery cutting parts such as sickle bars and forage chopper knives.

The safety council goes on to suggest that the easiest way to keep tools properly sharpened is to do it with equipment designed for the job. The power bench grinder, when properly used, will restore cutting edges on almost any type tool.

Bench grinders come in a variety of sizes and styles to fit the needs of a wide range of grinding tasks. Most generally, the unit uses a 3600 rpm motor with a shaft spindle on either end. Grinding wheels are fastened to the spindle with flanges and nuts. Motor sizes range upward from ¼ hp. A ½ hp is usually heavy enough for average farm shop tool grinding. The on-off switch should be at the front of the grinder.

Best grinder performance is very dependent upon correct selection of grinding wheels. Wheels are rated and used according to grit size. The fine or extra fine (100 to 200 grit) are recommended for keen edged tools, finish grinding and polishing. Medium fine (60 grit) works well for axes, woodcutting tools, and preparing surfaces for finishing. Medium or medium coarse (36 grit) are used for general machine shop use where fast removal of steel is needed. Coarse (24 grit) are good for heavy duty jobs such as sharpening plow shares.

Aluminum oxide abrasive wheels are used for general steel grinding. Silicon carbide abrasive wheels should be used for sharpening tungsten carbide tipped tools, masonry drills and the like.

Several precautionary measures should be observed when using grinders. Most important is the use of safety goggles on the operator or shatter-proof eye shields on the grinder. Further safety suggestions are: never grind on wheel sides; use wheel guards covering ¾ circumference of wheel; use flange sizes as recommended for particular grinding wheel; don't exceed maximum rpm shown on wheel; keep tool guards properly positioned; and never use on wood. When first starting a new wheel, stand aside for one full minute with it revolving at full speed just in case it may have a flaw or may have been damaged in shipment. □ □

HOME-BUILT elevator is powered by a 1/3 hp electric motor. In a year's time it does the Dickman brothers' former job of hauling 200 tons of feed and milk between levels in the dairy barn.

Inventive Brothers Lift a Load

Dairy barn elevator does back-breaking tasks

George and Henry Dickman of Garnavilla, Iowa, believe in a good trade—particularly when it's 2 solid weeks of hard work at 10 hours a day traded for about 25¢ worth of electricity.

The Dickmans accomplished this trade by removing the stairs in their dairy barn and installing an electrically powered elevator. The elevator now does their former daily job of hauling 8 to 10 cans of milk up from the milking floor level to the main floor and carrying 400 pounds of feed down to the cows.

They started out with a continuous chain lift or winch, powered by a ¾ hp electric motor. From there they built an "elevator cage," 30 by 42 inches, out of ¾ inch press wood and angle iron. The welding was done in their farm shop.

The electric motor has a power rating of 250 watts. This means 4 hours of running on 1 KWHr of electricity. Because they only run the elevator for 3 minutes a day in their feed-down and milk-up trips, it would take approximately 80 days to use up that KWHr of electricity.

In a year's time, 125 tons of milk come up and 75 tons of feed go down. This 200 tons of feed and milk means that 400,000 pounds of hand carrying are done away with, or 4,000 trips carrying 100 pounds each time. "It took us 2 minutes per trip, or 8,000 minutes. Converted to hours and days this would take 14 days with 10 hours each. That's two weeks time that we can be doing something far more important. Our 25 Guernsey cows take plenty of work and we're trying to get out of as much of it as possible," say the Dickmans.

The Dickman brothers' dairy elevator is just one more example of the inventive genius among farmers for developing or adapting machinery and equipment to save costs and reduce labor. □ □

Poultry House Ventilation

The secret of good ventilation in the poultry house is to allow small amounts of cold air to move into the house, let it warm up, absorb moisture, and then move out of the house carrying the moisture with it. This is most easily accomplished with an electric fan.

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Silage is fresh, palatable, pulverized. *Automatic Feeding and Leveling Adjustment* removes silage in even layers . . . always level. *Edge Cutter and Chipper* hugs the silo wall and "chews free" frozen silage. *Exclusive Gathering Chain* "rakes" the silage to the blower . . . where ALL loosened silage is delivered down the chute.

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extended vacations and more leisure time are made possible with electric dairy equipment maintained by only a skeleton labor force.

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practical and specific solutions to every-day problems in farm motor care and maintenance.

Shop Tool Series

another in the series of articles dealing with the use and application of various electric shop tools.

Supporting 20 Cows on 10 Acres of Hay Land

how top quality grass, harvested at the correct stage of growth, properly cured with electric drying equipment, provides maximum feed per acre for dairy cows.

Water Conditioning in the Farm Home

an electric pressure system, automatic water softener and large capacity electric water heater let a busy farm wife enjoy the best possible results from automatic laundry equipment.

PORTABLE drive-through hoist quickly lifts front end of wagon for quick unloading of corn.

Power Wagon Hoist

Wagon after wagon of corn is unloaded at the elevator on the William Gehring farms in Jasper county, Indiana. The wagon hoist is supported by a strong framework built after the plan of the farm engineer, Ernest L. Munter. As many as 30,000 bushels of corn have been grown in a single season on the Gehring farms, so only the very best of hoists will do.

Once a load of corn is on the "swing", it can be lifted until the wagon stands almost on its rear end. A touch of the switch lifts the wagon as high as desired, or sets it back down on the ground.

The illustration shows the hoist in operation. The 3hp electric motor, on top of the frame, is larger than is necessary, but was borrowed from a piece of equipment not needed at the time. "This hoist is quickly adjusted to any length wagon", said its designer, Ernest Munter. "Common hoists are not that handy, and they do not do the job as quickly as this one,"

GEORGE R. HARRISON

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the ultimate in year 'round watering!
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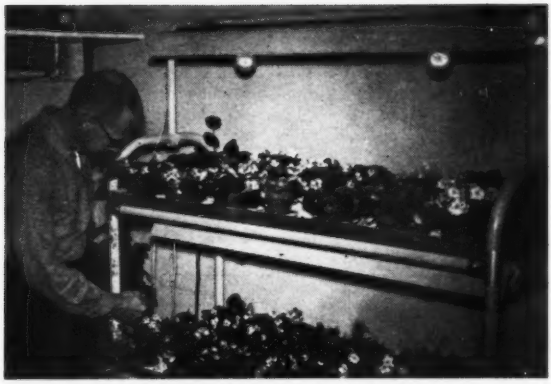

AFRICAN VIOLET "MACHINE" consists of a frame stand with 3 trays. Seventeen inches above each tray are two 40 watt fluorescent tubes and two 25 watt incandescent lamps which are time-controlled.

Footcandles for Flowers

William D. Tuckwiler, owner of the Mid-Valley Hatchery at Fairlea, West Virginia, has an interesting hobby that is also promoting customer good will. He is a producer of African Violets.

These delicate plants are temperamental in nature with respect to moisture, light and temperature. Properly husbanded, however, they may produce either a single or double blossom and, in fully mature plants, as many as 150 blossoms on a single plant.

African Violets can be propagated either by seed or leaf cuttings. The leaf cuttings are placed in a vial of water until rootlets appear. Then they are transferred to pots. The room temperature should be held between 65° and 75° F.

Light, too, is critical, especially if winter blooming is desired. From 300 to 600 foot candles of light are needed to insure the plant's blooming throughout the short days.

Bill bought a commercial African Violet "machine" which holds 3 trays of potted plants. Time-controlled fluorescent tubes over each tray operate 14 hours a day. The flowers will grow and bloom in ⅓ less time (about 6 months) under the lights.

Newly started plants are placed on the bottom tray, which is covered by a layer of moist sand. The two upper trays are covered by layers of moist grit on which larger plants are placed. The plants are watered regularly and a 40-50 percent humidity is maintained.

Tuckwiler has been growing African Violets for several years now and he says that it is a most fascinating and rewarding hobby.

E. O. Jones

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Cut Feeding Costs 20% to 40% and increase the weight of growing Pigs, Hogs, Cattle, Sheep and Poultry.
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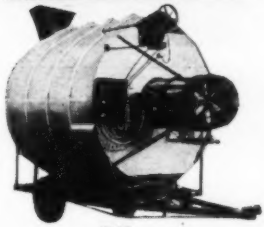

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- ✓ **COMPLETE**—An entire handling system which will fit into your present operation without special adaptation.
- ✓ **SAFETY**—New unmatched standards controlling pilot and power failure, excessive heat, low gas supply. Has automatic ignition. Burns low-pressure LP gas vapor with **BTU capacities up to 10,000,000** per hour.

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Crystal Lake, Illinois
Please send me details on your new American Automatic Grain Dryer.

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RFD_____
TOWN_____ STATE_____

Electricity in **THE FARM HOME**

BY ELINOR C. WUEHRMANN

The first practical standards for minimum quality home lighting were announced recently by the American Home Lighting Institute, a trade association of lighting fixture manufacturers and distributors.

The home lighting rules are called the "Minimum Light for Living Standards", and are expected to end any confusion about home lighting that has existed in the minds of distributors, contractors, architects, builders, and consumers.

To provide good lighting these rules must be applied correctly—for maximum effectiveness and beauty. Remember, these rules are only minimums—a starting point toward genuine light conditioning. Does your home meet the minimum standards?

Minimum Light for Living Standards

General Requirements

• All interior fixtures shall provide suitable shielding to prevent glare unless placed out of the line of vision.

• A minimum of one ceiling fixture shall be controlled by a wall switch at the room entrance. Where ceiling fixture is not installed a minimum of one wall bracket, valance, cove or cornice lighting unit must be wall switched at the room entrance.

• Where traffic pattern into a room is from two directions and more than ten feet apart, three-way control on general lighting is desirable.

• Recessed fixtures to accommodate 150 watts of incandescent or 80 watts of fluorescent tubes may be substituted where ceiling fixtures are required in these standards.

• Items marked with an asterisk (*) are desirable and will add safety and comfort in addition to the sale and resale value of the home.

Living Areas

1. Living areas within the scope of this standard include the living room, dining or dinette area, recreation, den, bedroom, study, library, reception hall, sun room, enclosed porches and other living areas not specifically covered. One of the following methods of illumination shall apply to each of the above areas.

A. A minimum of one ceiling fixture to accommodate at least 150 watts of incandescent;

B. A minimum of 60 watts (approximately 6 feet) of fluorescent lighting in valance, wall brackets, cove or cornice;

* A combination of A & B is desirable.

* Separately switched lighting for planned work, dining and recreation areas are desirable.

Kitchen Area

1. A minimum of one ceiling fixture to accommodate at least 150 watts of incandescent or 80 watts of fluorescent tubes.

2. One wall bracket or ceiling fixture above eating area within the kitchen.

3. One fixture above the sink.

4. Over the range and under cabinet lighting is recommended if these areas are not properly lighted from other sources.

Halls and Passageways

1. For each hall or passageway a minimum of one ceiling fixture, wall bracket, or 20 watts of fluorescent lighting shall be installed. One such fixture is required for every 15 feet of hall or passageway.

* A recessed fixture to accommodate 100 watts of incandescent is acceptable.

Bathroom and Lavatories

1. One of the following methods for illumination should be used:

A. One fixture located on each side of grooming area and one fixture located on ceiling or wall over grooming area;

B. When wall to wall mirrors are installed adequate illumination should be used over full length of mirror.

2. A vaporproof fixture should be installed in the tub or shower area when in separate enclosure.

Laundry-Utility-Workshop

1. A minimum of one ceiling or wall fixture for each principal work area.

Stairways

1. A wall or ceiling fixture shall be installed to provide adequate illumination for each stair flight.

Full Door Closets

1. A minimum of one fixture for each full door closet where arrangement permits.

Attic and Storage Areas

1. A minimum of one ceiling fixture or wall bracket.

Garage or Carport

1. A minimum of one ceiling fixture or wall bracket.

* One fixture for each parking area is recommended.

Outside the Residence

1. A minimum of one or more fixtures at each entrance of the residence.

* One or more directional fixtures or post lanterns are desirable for protective lighting, yard and driveway entrance areas. These should be controlled inside residence.

* One or more weatherproof outlets are desirable for yard maintenance, holiday lighting or for outside appliance use. One or more of these should be controlled inside the residence. □ □

Bakes evenly brown!

Cooks complete meals!

Cooks and serves quantity foods!

Washes in the sink!

Broils, fries, toasts, grills (Broiler-Grid, optional, $9.95)

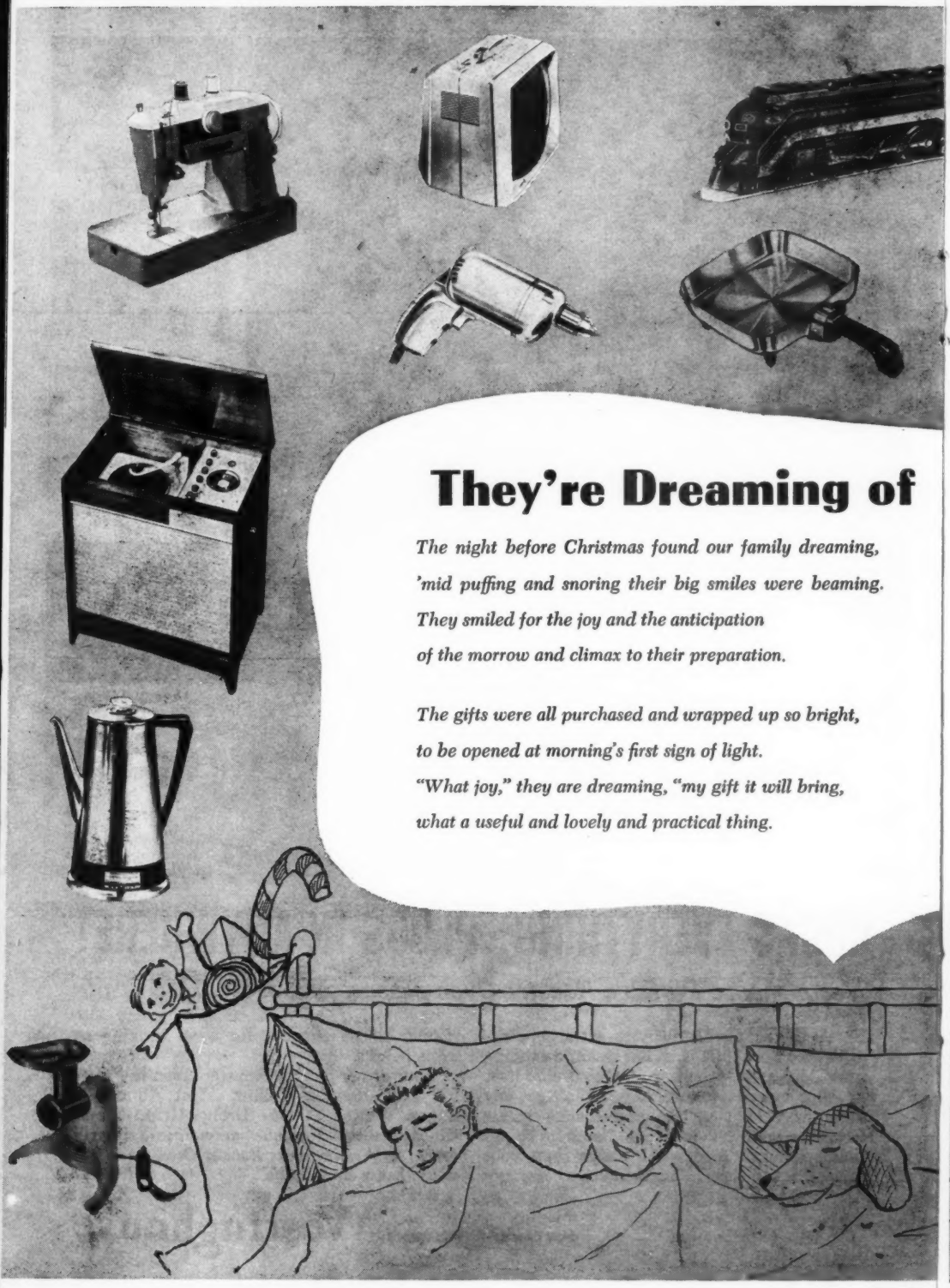
COOKS EVERYTHING..PLUGS IN ANYWHERE!

Westinghouse Portable Roaster-Oven prepares foods for 5, 15 or 50

Here's the economical way to extra oven capacity for the holidays, at harvest and canning time. And cook with clean, cool *controlled* heat . . . plus special advantages you can't get any other way. It's self-basting—cooks meats tastier and reduces shrinkage. Use it for things that spatter, it's so much easier than your range oven to clean. Plug it in anywhere, uses regular house current, for oven cooking at table height.

Your dealer has the Roaster-Oven in Frosting Pink, Lemon Yellow, Mint Aqua and Sugar White. $44.95. Broiler-Grid, Timer Clock, Cabinet (optional accessories) slightly extra. *A Westinghouse Roaster-Oven helps you to live better electrically!*

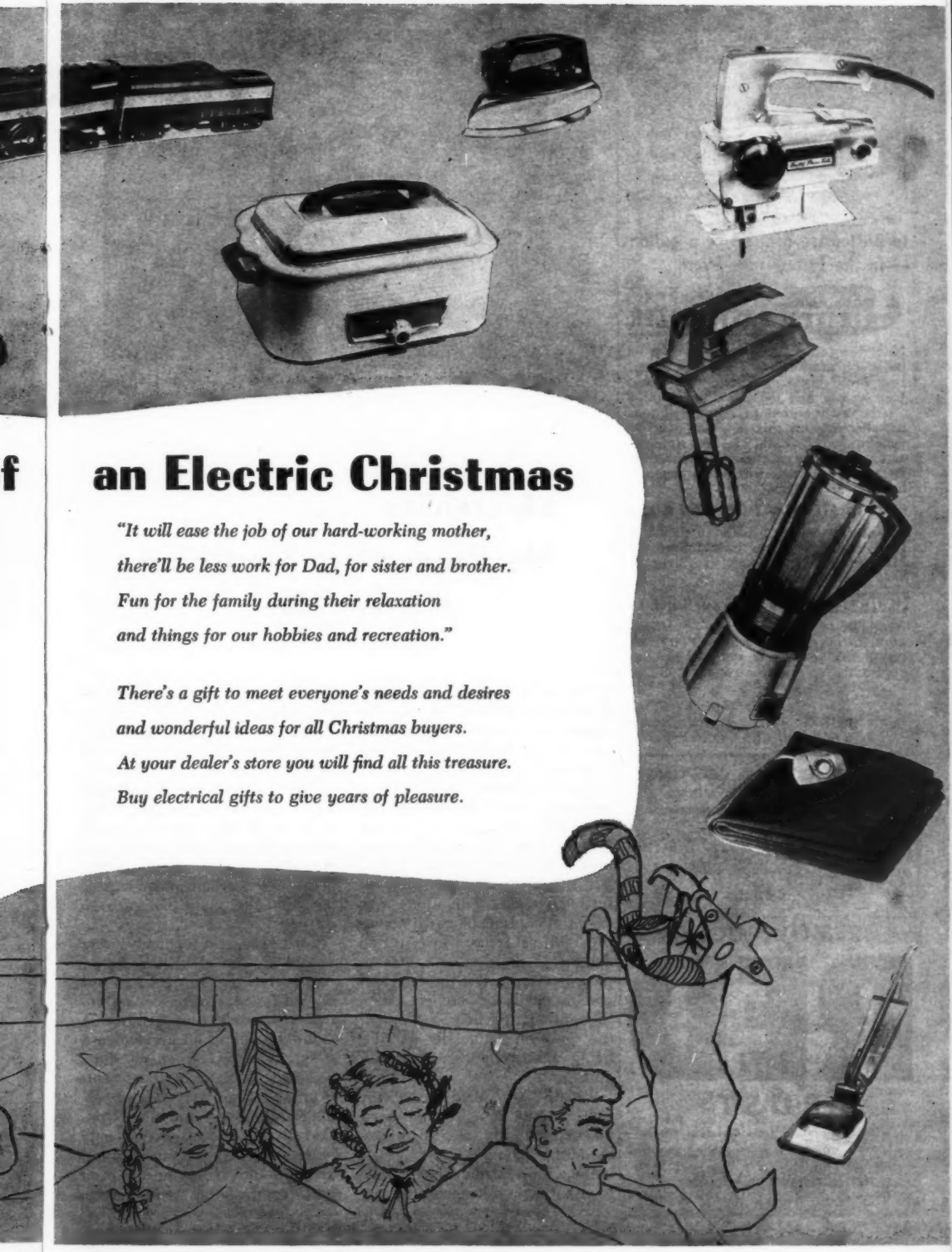
YOU CAN BE SURE...IF IT'S **Westinghouse**

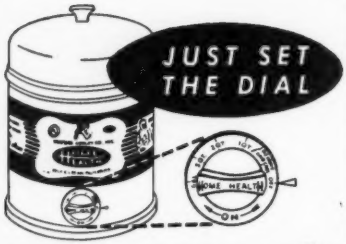


They're Dreaming of

The night before Christmas found our family dreaming,
'mid puffing and snoring their big smiles were beaming.
They smiled for the joy and the anticipation
of the morrow and climax to their preparation.

The gifts were all purchased and wrapped up so bright,
to be opened at morning's first sign of light.
"What joy," they are dreaming, "my gift it will bring,
what a useful and lovely and practical thing.


an Electric Christmas
"It will ease the job of our hard-working mother,
there'll be less work for Dad, for sister and brother.
Fun for the family during their relaxation
and things for our hobbies and recreation."
There's a gift to meet everyone's needs and desires
and wonderful ideas for all Christmas buyers.
At your dealer's store you will find all this treasure.
Buy electrical gifts to give years of pleasure.



to pasteurize a quart or a gallon —in the fastest time ever!

HOME HEALTH "Quick-Set" PASTEURIZER

Now you can pasteurize the amount of milk you need as you need it . . . one, two, three quarts or a gallon at a time. Just set the dial for the right amount . . . the rest is automatic. The only home pasteurizer with this new engineering development that takes far less time yet assures greater accuracy. Laboratory tested for complete kill of all harmful bacteria.

CUTS PASTEURIZATION TIME 40%

You can pasteurize a gallon in 40% less time . . . a quart in less than 15 minutes! Makes it easier, quicker, than ever to have disease-free milk.

COLORS *to match your kitchen*

Available in decorator colors of yellow, pink, turquoise, and white. You'll be proud of its beauty, its convenience, its dependability. 1 gallon capacity. Guaranteed for 1 year.

Ask to see the new HOME-HEALTH "Quick-Set" Pasteurizer at your dealer or write for FREE FOLDER.

WATERS CONLEY CO., INC.
Dept. E, ROCHESTER, MINN.

Tell your dealer you saw it in
ELECTRICITY ON THE FARM
Magazine

REMOVE UGLY

RED

RUST

with a Diamond Iron Removal Filter
Leaves water clear, sparkling-palatable. Write:

OSHKOSH FILTER AND SOFTENER CO.
Oshkosh **Wisconsin**

A TAKE-IT-EASY life was prescribed for Mrs. Macke. One part of her easy-to-take, preventive medicine is this new garbage disposer.

Electricity . . . My Preventive Medicine

By FAITH E. MACKE
Janesville, Wisconsin

Electricity is my preventive medicine and quite the pleasantest I have ever had prescribed for me. No terrifying shots and no bitter taste.

How did electricity become a preventive medicine for me? Almost two years ago I had my first attacks of multiple sclerosis, and doctors advised that I learn to "take it easy" to avoid further attacks. The advice was easy to give but difficult to comply with as I have three small daughters and all the accompanying work. But my husband and I gave the advice much thought. Hired help was out of the question financially, besides being almost impossible to obtain.

Finally, we decided that the best way to give me a "semi-take-it-easy" life was to build a modern, completely electric home. Our new home has proven to us that with electrical appliances, even a busy mother can take it easy.

We have lived in our new home for nearly a year now and I have almost forgotten the chore of disposing of garbage. Last year, garbage meant a trip to a neighbor's chicken yard, with a heavy laden kettle and scraper. Now it means a trip across the kitchen and a flip of a switch. Yes, I love that garbage disposer!

Last year, and for many years before, I shovelled the major part of ten tons of coal into our temperamental furnace—and removed the fine, dusty ashes, too —plus travelling up and down a steep flight of basement stairs at least six times a day. This year we set our electrically operated thermostat and that wonderful oil burner heats only when necessary, saving fuel and keeping our house at an even and comfortable temperature.

MAMMA GETS SOME HELP from 4-year-old Cindy. Her modern, built-in surface units and electric oven greatly ease her cooking chores.

You have to shovel coal for awhile to really appreciate the wonders of automatic heat.

Wash day was a day of ups and downs for me for many years, plus anxious scanning of the horizon for rain clouds. Now a shiny automatic washer and dryer sit side by side in a laundry adjoining the kitchen. The laundry is such a "snap" now that I usually plan on baking a batch of cookies in my new wall oven between loads of clothes.

Our 18 foot freezer, along with our refrigerator, allows me to shop only once every two weeks, a real time and energy saver.

And our new home is adequately wired—no blown fuses no matter how many appliances are being used at once.

I love my "preventive medicine". In fact I just don't see how I could do without it. Many people have health problems and handicaps. I wonder how many of them have thought how the use of electricity could help them do their jobs well and easily. True, electrical appliances and good, adequate wiring do cost money, but so do prolonged stays at hospitals.

We invested in electricity—we don't intend to invest in any further hospitalization. □ □

WASH DAY used to be a strenuous day for Faith Macke. Now, within a small area, the laundry is automatically washed, dried and ironed.

the BIGGEST built-in oven EVER

Monarch Fully Automatic Oven, 6757.5 CUBIC INCHES, with "twin-lite" oven control, automatic pre-heat push button, clock-timer, "Smokeless" broiler, removable oven parts and extra heavy wiring and insulation throughout. What's more, control knobs are ABOVE the oven to give perfect eye level control. Divided top or clustered top surface units. Controls can be mounted safely on wall out of reach of children. Write for information.

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9247—Tailored dress with smart yoke, neatly tucked bodice; easy-fitting skirt. Printed Pattern in Misses' Sizes 12-20; 40-42. Size 16 takes 4½ yards 39-inch fabric.

9099—A 12-garment DOLL WARDROBE to thrill any little girl on Christmas morning! Dress, bonnet, coat, booties, snowsuit, playsuit, kimono, bunting, sleeper, sacque, slip, diaper. Printed Pattern for dolls 10,12, 14, 16, 18, 20 inches tall. See pattern for yardages.

Send THIRTY-FIVE CENTS (in coins) for EACH pattern to: ELECTRICITY ON THE FARM, P. O. Box 42, Old Chelsea Station, New York 11, New York.

IN CANADA: Patterns are 40¢ EACH. Address: 60 Front St. West
Toronto 2, Ontario

Add FIVE CENTS for EACH pattern for First Class mailing.

An electric sewing machine changed my

Tucks to Ruffles

By **AREL SHULTZ**
Hereford, Texas

All my life I have liked to sew, and have done a lot of sewing of plain to fancy kinds. But for the past few years my old treadle machine was so hard on me, I gradually sewed less and less. For trim, I did well to get a few tucks on the garment. If I did not finish a garment in one day, I was still too weary the next day to finish it. Sewing became a dreaded chore.

An electric sewing machine then entered my life, and ever since I have wondered why I did not get it sooner. We use electricity for so many things, and find it such a dependable labor and time saver, I regret that I suffered so long with a treadle machine.

Now my sewing is dressed up with trim other than just a few tucks. I am able to do fancy ruffling and even put lace onto the ruffles with an attachment I have. Before, I had to baste every stitch of a ruffle's edge, a very discouraging task when you want to rush a new dress up. I have several attachments I use for trim, which I never had before.

For years I have let my scraps accumulate from my sewing, so I had boxes of scraps in every closet. Now these are a treasure for new ideas. I am making trims for aprons from some favorite dresses long worn out. I make applique patterns and can quickly attach them to an apron with an attachment that gives a professional look.

Coats had been one slow job for me until I got an electric machine. Since I am on the heavy side, I find few coats in town to fit, and then they are not the color or style I like. By sewing my own coats, I can get just what I want.

Just because I live 25 miles from town is no reason I am not as up-to-date as my city friends. With electricity, I have been able to do so many things the easy way it puzzles me why I waited so long to get an electric sewing machine. We are a family of moderate means. But I see now, if necessary, I could pay for an electric sewing machine just sewing for the public. I'd get the machine before I got any other appliance if I had my life to live over. □ □

Thanksgiving Finale!

Thanksgiving dinner puts your cookery on parade before the whole family, so for a well-favored finale to the traditional turkey feast, serve Thanksgiving Cocoa Cake. The rich brown cocoa color of the cake is set off by the pure white 7-minute frosting. In tune with the season, the top is decorated with a garnish of dainty fans made with thin strips of dates. Paper cornucopias overflowing with miniature fruits circle the plate.

THANKSGIVING COCOA CAKE

Preparations: Have shortening at room temperature. Use two round 8-inch layer pans, 1¼ inches deep; line bottoms with paper. Start oven for moderate heat (350° F.). Sift flour once before measuring.

1⅔ cups sifted cake flour
1 teaspoon soda
1 teaspoon salt
1⅓ cups sugar
½ cup cocoa
½ cup shortening
milk*
1 teaspoon vanilla
2 eggs, unbeaten

*With vegetable shortening, use 1 cup milk. With butter, use 1 cup minus 2 tablespoons milk.

1. Measure dry ingredients (first five) into sifter.
2. Put shortening into mixing bowl, stir to soften.
3. Sift in dry ingredients.
4. Add ¾ cup of the milk and mix until all flour is dampened.
5. Beat 2 minutes at low speed of electric mixer, (300 vigorous strokes by hand).
6. Add remaining milk and eggs and beat 1 minute longer in mixer, (150 strokes by hand).
7. Pour batter into pans.*
8. Bake in moderate oven (350° F.) 35 minutes, or until done.
9. Cool and frost with 7-minute frosting, and garnish with clusters of slivered dates.

*This cake may also be baked in a 9x9x2-inch square pan in moderate oven (350° F.) 35 to 40 minutes.

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HOME PASTEURIZER

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1 gal. size
5 qt. capacity
$27.95

2 GALLON SIZE $36.50

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1 Island Avenue, Batavia, Illinois

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Write for Bulletin 903.

STRATAFLO PRODUCTS, INC.
Fort Wayne 1, Indiana

No. 2 Regular Edition

FFA Produces Champions in Farm Electrification

Youthful farmers show inventive genius at 30th annual convention

Earl S. Stinson, 19, of Rocky Gap, Virginia was named winner of the Future Farmers of America national award for achievement in Farm Electrification. He received a $250 reward during the 30th annual national FFA convention held in Kansas City, Mo., last month.

Three other Future Farmers received awards of $200 each as winners of regional awards in Farm Electrification. They are Robert A. Yetter, 18, Newton, New Jersey; Bobby Castle, 19, Oil Springs, Kentucky; and Brad Frank, 18, Tremonton, Utah.

Funds for the awards were provided by the Future Farmers of America Foundation, Inc., which is supported by annual contributions from 300 business and industrial firms, organizations and individuals. Each of the four winners previously had received $100 for being tops in his state, and they shared a $250 fund that is provided to help pay their expenses to Missouri.

Earl S. Stinson

National Farm Electrification award winner, Earl S. Stinson, is enrolled in the vocational agriculture course at Rocky Gap, Va., High School. His parents are Mr. and Mrs. L. A. Stinson.

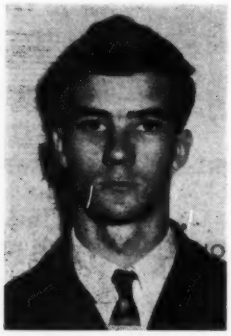
An illness which kept him out of school two years and left him with a slight heart condition was responsible for sparking Earl Stinson's interest in electrical work. Faced with a long period of convalescence in which he needed to avoid physical exertion, Earl turned to the study of electricity, with particular emphasis on using power to make farm work easier. Earl and his parents had the help of his agriculture instructor, Bruce Robertson, in planning a comprehensive electrification program for their 75-acre home farm.

Aside from minor repair work on appliances, Earl's first electrification job was to install a motor on his mother's old foot pedal sewing machine. Then, ready for bigger things, Earl rewired the farm home. That led to the installation of an electric pump for home water supply.

Other jobs performed by the student in the last four years have included extending electric service to 9 farm buildings, rewiring two dwellings and three other farm buildings, establishing and wiring a farm shop, and building numerous pieces of electrical equipment. He inspected the wiring on three buildings and removed 48 electrical hazards.

Earl has built two farm trailers and wired them for lights; took parts from discarded radios and built a new one that works; obtained a discarded army slaw cutter and rebuilt it into a two-speed disc sander valued at $185; constructed a thermostatically-controlled chick brooder using infrared heat lamps, and estimated that he has done repair work on at least 20 motors.

During the past three years, Earl has served as school elec-

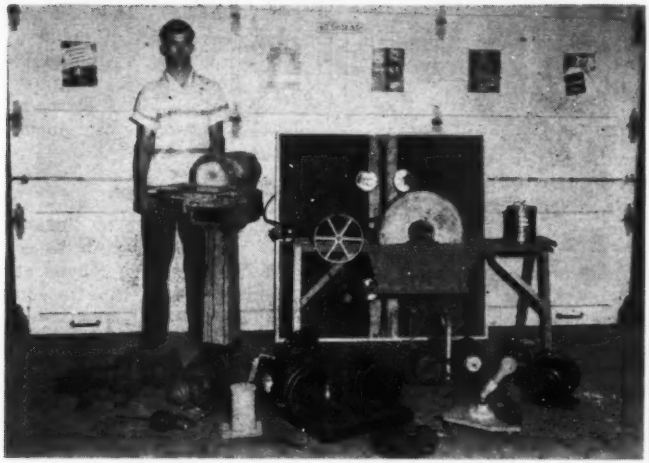


EARL S. STINSON
National

ROBERT A. YETTER
North Atlantic

BOBBY CASTLE
Central

BRAD FRANK
Pacific



NATIONAL WINNER, Earl Stinson, is shown with some of his senior-year electrical projects. They have resulted in a great savings to him and greatly increased the efficiency of his farm. Earl put in a total of 545 hours on electrical projects this year.

trician, taking care of electrical maintenance work on 6 school buildings.

Along with this outstanding record in electrification, Earl has had a farming program that was good enough to earn him the FFA's State Farmer Degree. During the past year his program included one cow and calf, two stands of bees, two pigs, four acres of orchard, one acre of small fruits, and one-fourth acre of garden.

Robert A. Yetter

Robert Yetter, winner for the North Atlantic Region, was graduated from the Newton, New Jersey, High School last spring after completing two years of vocational agriculture under the instruction of Louis Gombosi. His parents are Mr. and Mrs. Walter W. Yetter.

The Yetters operate a dairy farm that is described as one of the most completely electrified farms in the State of New Jersey. Robert has become skilled in operation and servicing of all the equipment, including milkers, hay drier, coolers, hay elevator, ventilating fans, shop tools, welder, and many others.

He was responsible for wiring the barn for heavy duty electrical service; also wired a chicken coop, and replaced a worn electrical line from the house to the barn.

Using electrically powered tools, Robert has built a stone boat, truck rack, three hay racks, two wagon bodies, a feed box, three gates, and a power unloader for wagons.

He has been an outstanding FFA leader in the State. Last year Robert was vice president of the Newton FFA Chapter and also of his district association. Currently, he is enrolled at the University of Maryland studying agricultural education.

The New Jersey Future Farm-

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Supply connection is for ¾" iron pipe—outlet for ¾" hose coupling.

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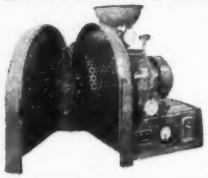

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Heavy Duty Ball-Bearing Pump
Up to 7,500 GPH; or 3,000 GPH from 25' well, 1¼" inlet; 1" outlet $12.95
Postpaid if cash with order. MONEY BACK GUARANTEE.
LABAWCO PUMPS, Belle Mead 49A, New Jersey

CASH FILING SAWS

Make up to $3 or $5 an hour in your spare time. Start saw filing shop in basement or garage. No experience needed to turn out perfect cutting saws with machine accuracy of Foley Automatic Saw Filer. No canvassing—steady year round CASH business, ideal for small towns. Free Booklet—"MONEY MAKING FACTS"—shows how to start. No salesman will call. Send postcard today.

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401 Main Street • Conrad, Iowa

er's individual farming program during the past year included three cows and five heifers, 200 broilers, and two acres of corn.

Bobby Castle

Bobby Castle, winner for the Central Region, was graduated from the Oil Springs, Kentucky, High School where he completed four years of vocational agriculture studies. His parents are Mr. and Mrs. Angus Castle.

Bobby has had the unique experience of extending electrical power to operations of a coal mine as well as to the farm and home.

When he was a freshman he became interested in home improvement and together with his father, vocational agriculture instructor, Bill Stapleton, and his power company technician, laid out a wiring plan for the Castle's new farm home.

The Castles operate a small coal mine on the farm and by reducing operation costs have made it a profitable enterprise. A big factor in reducing operation costs was the switch from mule and man power to electrical power. Formerly a mule and two men operated a mine cart. Bobby and his father replaced this with a farm-made electric coal buggy.

Electric power was also extended to their advantage for cutting coal, pumping out water and ventilating the mine. Bobby and his father did all of the electrical work for these applications.

During his junior year he provided the farm with lawn and farm lot lights and equipped and installed many pieces of electric power equipment in his farm shop. Bobby and his dad also installed an electric pump at the source of water supply to provide water in the home and farm buildings.

In the past four years, he has built an electric lawn mower, four mine buggies, two chick brooders, water warmer for chicks, electric fence, power saw and grain cleaner.

Bobby's farming program during the past year included six head of beef cattle, 200 poultry, four acres of hay, three acres of corn, and one-half acre of strawberries. He planted 4,000 seedlings in a forestry improvement program.

Brad Frank

Brad Frank, Pacific Region winner, is a 1957 graduate of the Bear River High School at Tremonton, Utah. He is the son of Mr. and Mrs. Duane Frank.

Brad lives on an 80-acre farm in Northern Utah. Their principal crops are corn, barley, sugar beets and alfalfa. The Franks also have a small dairy herd of 15 cows and fatten 15 to 20 head of steers every year.

Much of Brad and his father's work is done after dark or before daylight. Good outside lighting around the yard and corrals makes their work easier and saves time.

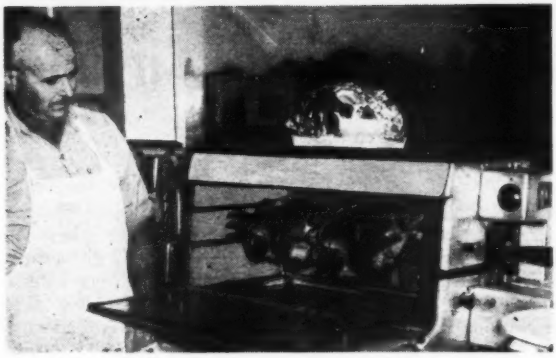
Their farm shop is well equipped with electrical equipment. They use electricity for arc welding, sharpening farm tools, charging batteries, drilling holes and compressing air. They built their own walk-in milking parlor out of pipe welded in the farm shop.

With his father's help, Brad built a machine to unload chopped hay from the wagons. It is provided with a ½ hp electric motor.

In the High School farm mechanics shop he has built an electrically heated water trough, feed box that fits on the back of a tractor, and a small air compressor.

During Brad's senior year, William Merrell, his vocation agriculture instructor, assigned him the job of maintaining and servicing all of the electrical equipment in the school mechanics shop.

His farming program during the past year included two Hereford steers, two milk cows and a heifer, one acre of sugar beets and ten acres of Red Clover for seed. □ □



Barbecuing Sells More Birds For DeLorenzo

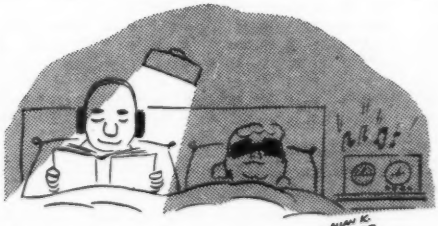
Housewives don't like to cook on hot days, especially when on vacation or going down to the beach cottage for a weekend. This has all helped turkey grower, John DeLorenzo, Duxbury, Massachusetts, to increase his year-round sales by retailing barbecued chickens and turkeys. DeLorenzo sells his birds strictly through his farm store.

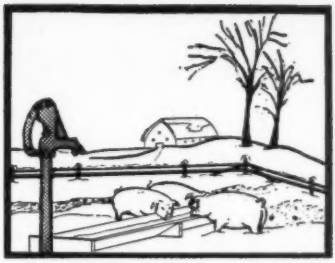
John, famed as having the largest turkey porch in the Northeast, a 100 ft. by 215 ft. structure holding 8,000 birds, cut his flock in recent years to 5800 turkeys to comply with his own retail market demands. Only 5% are Broad Breasted Bronze. The rest are the popular White Hollands. Ducks, chickens and geese are purchased from neighboring growers.

DeLorenzo advertises his barbecued birds in the local papers and displays this information prominently on his attractive roadside sign. Barbecuing is done in electric rotisseries. The demand has increased to such an extent that he has installed three machines, 2 two-bird machines and one that will hold six turkeys. His capacity is 10 turkeys or 12 chickens at a time.

Hot Barbecued turkeys are wrapped in aluminum foil for customer convenience or cooled and frozen for later sale. Stuffed turkeys are barbecued only on order. One of the two bird rotisseries is set up and operated in the salesroom window to attract attention.

Barbecuing has successfully sold many birds for John DeLorenzo. Good merchandising and promotion keeps John's customers coming back for more so that he has a year-round, instead of a holiday business.





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Code Requirements for Motor Circuits

By MORRIS H. LLOYD

In the past several years a number of bulletins and articles have appeared on the subject of wiring for motors on the farm. Often one or more tables are included which show the size of wire needed to supply different sizes of motors at various distances from the electric service entrance.

The wire sizes given in such tables are usually based on some maximum allowable drop in voltage or pressure. Some such tables may be based on a maximum of 10 volts drop on starting or, perhaps, on 2 percent voltage drop when the motor is running at its full load.

When the length of the circuit to the motor is 40 feet or less, it is quite likely that such tables of wire sizes may suggest the use of wire that is smaller than the National Electrical Code will permit.

The National Electrical Code places certain limits on the amount of current (amperes) that different sizes of wire can carry with different types of insulation. The purpose of these limitations is to prevent damage to the insulation from overheat.

The 1957 edition of the Code contains several tables of information which are useful to anyone who has to select the size of wire for a motor or any other piece of equipment. Table 22 of this Code gives the full load currents of the different sizes of motors generally used on the farm. Table 20 gives the smallest size of copper wire permitted in cable or conduit, or underground for these motor currents. Table 2 gives the minimum sizes of copper wire in air, that is, overhead—for different amounts of current. Since these tables also contain a great deal of other information, the concise table below will give the information needed in figuring the minimum size of wire needed for different farm motors which the Code will permit.

Several types of wire are mentioned. Wires used in most of the Type UF plastic covered cables and in ordinary nonmetallic sheathed cable are either rubber covered Type R, or plastic covered Type T or TW. In service entrance cables which are often used for supplying the larger motors, rubber insulation type RH (heat resistant) is com-

NOTE: The National Electrical Code, 1957 Edition, is published by National Fire Protection Association, Boston 10, Mass.

Wire Sizes for Single Phase Farm Motors

Motor H.P.	Full Load Amperes*	Minimum Allowable Size of Copper Wire: In Cable, Conduit, or Earth Types R, T, TW	In Cable, Conduit, or Earth Type RH	Overhead in Air† Type WP	Overhead in Air† Type TW	Distance (Feet) from Service Entrance to Motor** Types R, T, TW, RH: 0-20	30	40	50	60	70	80	100	120	140	160	200	240	280	320	360	Motor H.P.
	115 volts																					
¼	5.8	14	14	10	10	14	14	14	14	14	14	14	12	12	10	10	10	8	8	8	6	¼
⅓	7.2	14	14	10	10	14	14	14	14	14	14	12	12	10	10	10	8	8	8	6	6	⅓
½	9.8	14	14	10	10	14	14	14	12	12	10	10	10	8	8	8	6	6	4	4	4	½
¾	13.8	12	12	10	10	14	14	12	10	10	10	8	8	8	6	6	4	4	4	2	2	¾
1	16.	12	12	10	10	12	12	12	10	10	8	8	8	6	6	6	4	4	2	2	2	1
	230 volts																					
¼	2.9	14	14	10	10	14	14	14	14	14	14	14	14	14	14	14	12	12	10	10	10	¼
⅓	3.6	14	14	10	10	14	14	14	14	14	14	14	14	14	12	12	10	10	10	8	8	⅓
½	4.9	14	14	10	10	14	14	14	14	14	14	14	12	12	10	10	10	8	8	8	6	½
¾	6.9	14	14	10	10	14	14	14	14	14	14	12	12	10	10	10	8	8	6	6	6	¾
1	8	14	14	10	10	14	14	14	14	12	12	12	10	10	8	8	8	6	6	6	4	1
1½	10	14	14	10	10	14	14	12	12	10	10	10	8	8	8	6	6	4	4	4	4	1½
2	12	14	14	10	10	14	12	12	10	10	10	8	8	6	6	6	4	4	4	2	2	2
3	17	10	10	10	10	10	10	10	10	8	8	8	6	6	4	4	4	2	2	2	1	3
5	28	8	8	10	10	8	8	8	8	6	6	6	4	4	2	2	2	1	0	0	2/0	5
7½	40	6	6	10	8	6	6	6	6	4	4	4	2	2	2	1	0	2/0	2/0	3/0	3/0	7½
10	50	4	6	8	6	(See Col. 1, 2)	4	4	4	2	2	1	1	0	2/0	3/0	3/0	4/0	4/0	10		

Wire in overhead spans must be at least No. 10 to stand wind and ice conditions.

†When distance between supports of the span is over 50 feet, No. 8 is smallest size allowable.

*Motor currents given above are taken from the 1957 Edition of the National Electrical Code, Table 22.

**Table based on 10 volt maximum drop on starting.

mon. For overhead spans outdoors, either weatherproof wire Type WP with impregnated cotton braid or Type TW with plastic insulation are used.

The minimum allowable sizes of wire given in this table are large enough to carry the currents shown without overheating the insulation. *For distances over 40 feet it will usually be necessary to use larger wire sizes shown on right hand section of chart so as to deliver the current at the proper voltage or pressure.* (The full load current of the largest motor on the circuit is multiplied by a service factor of 1.25 to help take care of the higher starting current requirements.)

For example, lets take a 5 hp farm motor and see what size wire is needed to supply it. The table below shows that No. 10 wire is the smallest allowable outdoor feeder, provided spans do not exceed 50 feet. No. 8 wire is the smallest allowable size in cable, conduit, or earth. Therefore No. 8 is the smallest size that should be used for the branch circuit wiring. However note that No. 8 wire is not suitable for branch circuit distances over 50 feet. A distance of 100 feet, for instance, calls for No. 4 wire. Since this is larger than the No. 8 required by Code, it should be used to provide satisfactory maintenance of voltage. □ □

Heat Lamp Thermostats

▶**Question:** *What type of thermostat is recommended for use with heat lamps?*

M. S. C., Arkansas

▶**Answer:** For brooding units using three or more infrared lamps, the conventional wafer type thermostat with the snap action silver contact switch is satisfactory. The use of such controls will materially reduce operating costs.

Poultry Feeder

▶**Question:** *How much lineal space should be provided for chickens on mechanical feeders?*

A. W. S., Wisc.

▶**Answer:** Texas A and M College recently set up the following standards for mechanical feeders: Broiler chicks should have 1.5 linear inches up to three weeks of age; 3 linear inches for the remainder of their nine week growing period. Iowa State College suggests 5 linear inches for each grown layer. Each bird should also have an inch of watering space.

New Publication

• "Drying Farm Crops" by Carl W. Hall. Edward Bros., Inc., Ann Arbor, Michigan. 336 pages, $7.00. First book devoted entirely to drying farm crops and related topics. Basic data on equilibrium moisture content; drying theory; moisture determination; use of heated air; forced air drying systems; air movement, including fans and ducts, and aeration systems are presented.

Typical drying and aeration installations are presented, including costs involved and returns which can be expected. Over 320 references, 170 figures and 60 tables are included. Both practical and technical phases are presented, making the book particularly useful to those interested in the engineering and application phases of crop drying.

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When writing to these Manufacturers be sure to mention you saw their advertising in ELECTRICITY ON THE FARM Magazine.

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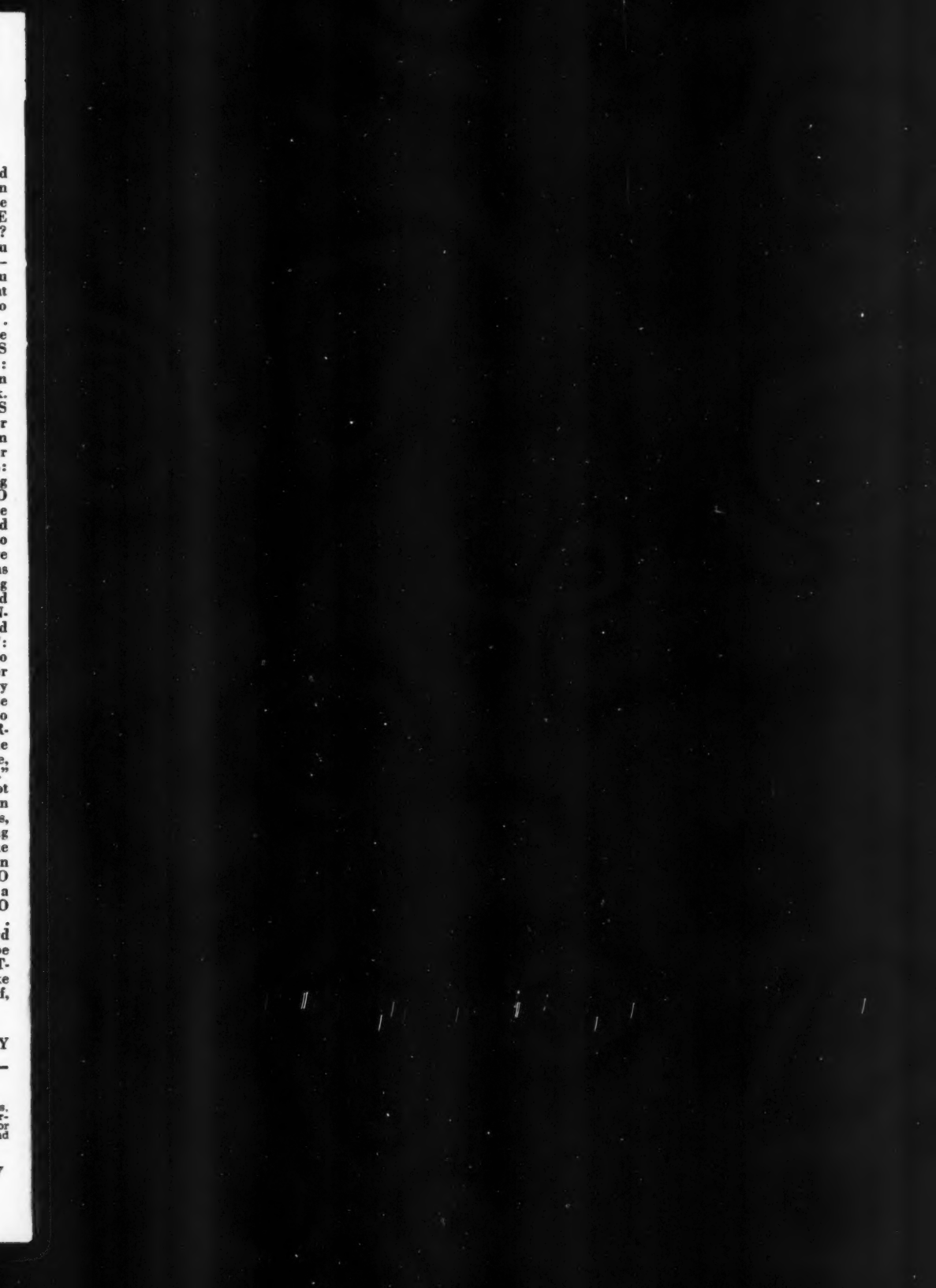

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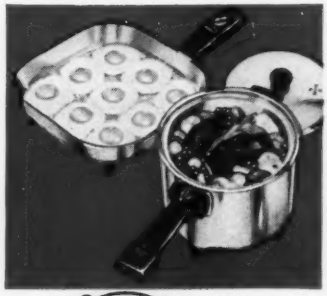

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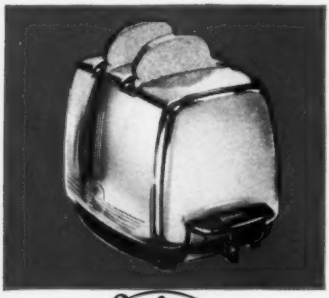

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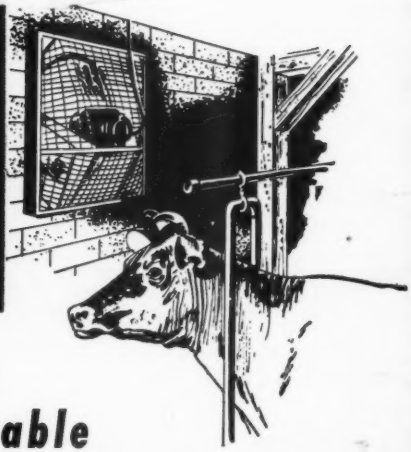

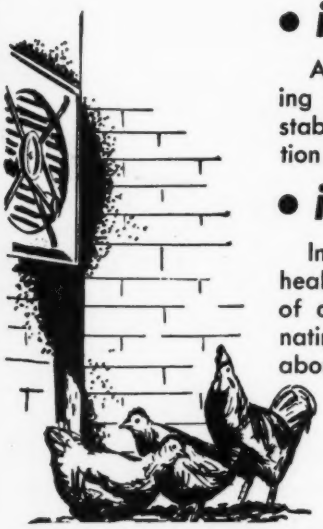

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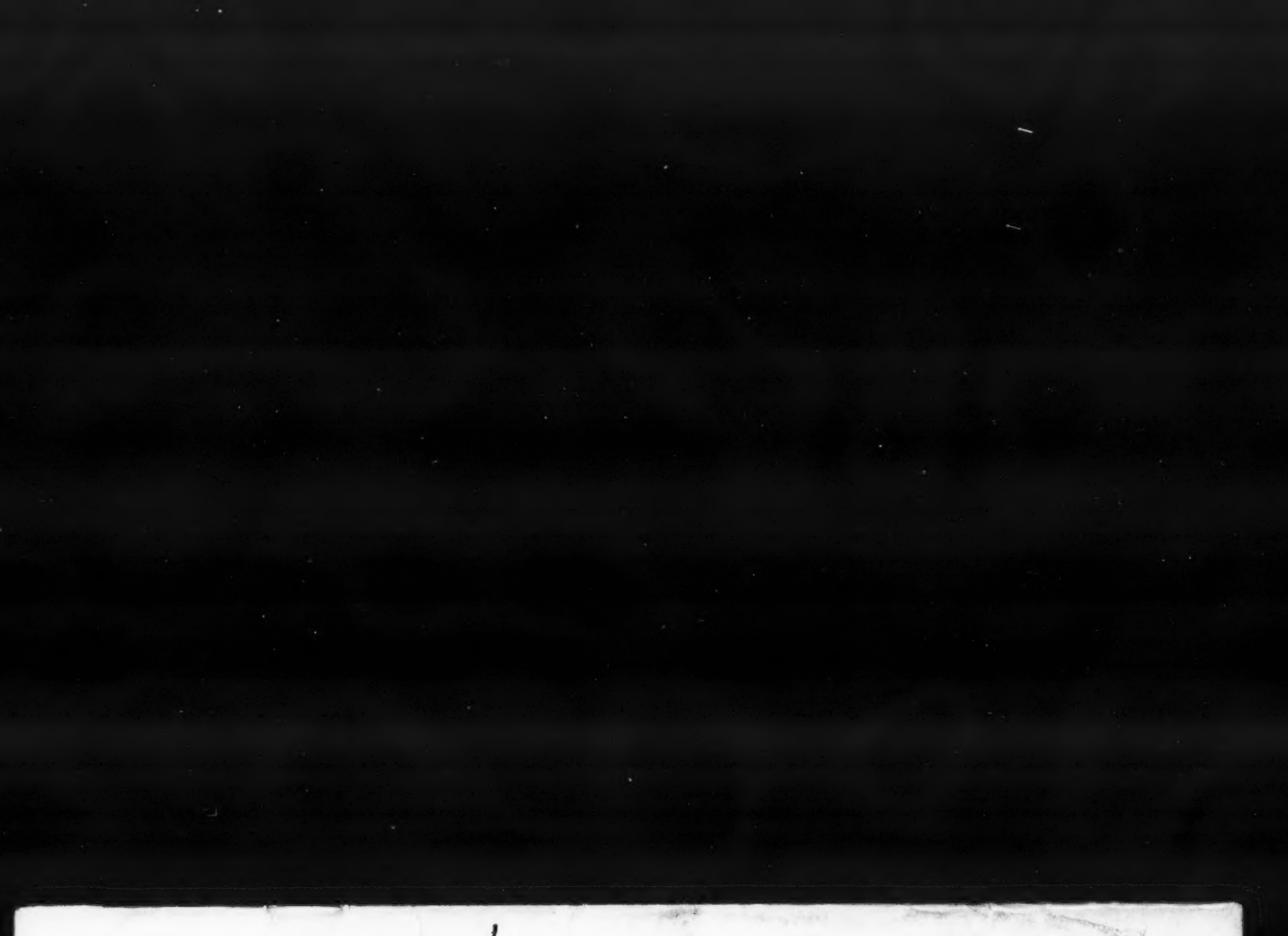
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